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Deposition of tin(II) sulfide thin films by ultrasonic spraypyrolysis: Evidence of sulfur exo-diffusion

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Abstract: Tin Sulfide (SnS) thin films were deposited by ultrasonic spray pyrolysis technique, on glass substrate heated at 280 °C, with different deposition times. The used precursor SnCl2 and thiourea are dissolved in methanol. X-ray diffraction (XRD) analysis indicates that films are mainly composed with orthorhombic SnS phase at low deposition time. With increasing deposition time, the hexagonal SnS2 phases become dominant. SnO2 and metallic Sn phases have been detected with increasing deposition time. Scanning electron microscopy (SEM) observations reveal that films surfaces are rough with the presence of bubbles due to S2 gas exo-diffusion from the bulk during film growth. A model of S gas formation is presented.

Keywords : Tin Sulfide Thin films Spray pyrolysis